Chapter 2 Terminology
Chem 1A
Dr. Cinzia Muzzi

Again, this information is meant to supplement your notes. This is not a complete guide to the chapter.

I. History of Chemistry
Law of Conservation of Mass: The total mass remains constant during a chemical reaction.

Law of Definite Proportions: A given compound always contains the exact proportion of elements by mass.

Law of Multiple Proportions: When 2 or more different compounds of the same two elements are compared, the masses of one element that combine with a fixed mass of the second element are in the ratio of small whole numbers.

Dalton's Atomic Theory
- All matter is composed of small indivisible particles.
- All atoms of a given element are alike, but atoms of one element differ from atoms of another element.
- Compounds are formed when atoms of different elements combine in fixed ratios.
- A chemical reaction involves a rearrangements of atoms (THAT IS IT!)

II. The Atom
Atomic Number (Z): The number of protons in the atoms of a given element. (This is what makes the element what it is!)

Mass Number: The number of protons plus the number of neutrons (this is **not** the same as the atomic mass).

Isotopes: Atoms with the same number of protons, but a different number of neutrons.

Atomic Mass: The weighted average of the masses of the naturally occurring isotopes of the elements.

III. Molecular Compounds
Molecular compounds contain covalent bond. The atoms are held together by shared pairs of electrons. Molecular compounds are made up of non-metals (this is a "for now" definition!)

Chemical Formula: A representation of the molecule using chemical symbols from the periodic table to indicate the number and type of atoms in the molecule. There are several types of chemical formulas.

Empirical Formula: The simplest chemical formula that represents the type and **ratio** of elements (atoms) present in a molecule.

Molecular Formula: A chemical formula that represents that **actual number** of atoms present in a molecule. (These formulas do not necessarily show connectivity.)

Structural Formula: A chemical formula that shows the connectivity of the atoms as well as the number and type of atoms in the molecule. (A **Condensed Structural Formula** also shows the connectivity of the atoms in the molecule, but without the dashes representing the covalent bonds.)

Isomers: Molecules that have the same empirical and molecular formula, but not the same structural formula. The connectivity of the atoms is different in each molecule.

III. Ionic Compounds
Ionic compounds contain ionic bonds. The ions are held together by electrostatic attraction. Ionic compounds consist of a metal plus a non-metal (again this is a "for now" definition.)

Ions: An electrically charged atom or group of atoms. (An atom that has gained or lost electrons.)

Polyatomic Ion: Charged group of bonded atoms (these are those icky things you have to memorize on table 2.4).

Salt: An ionic solid consisting of oppositely charged ions.

Formula Unit: The simplest collection of cations and anions that represent an electrically neutral compound (This is a theoretical unit. It does not actually exist.)

Anions: Negatively charged ions.

Cations: Positively charged ions.

IV. Acids and Bases

Acid: Compounds that ionize in water to form the hydronium ion or H^+ (this is a "for now" definition.)

Bases: Compounds that ionize in water to form the hydroxide ion (this too is a "for now" definition.)